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Indian Standard

PORTABLE KIT FOR QUICK DETECTION OF ADULTERANTS/CONTAMINANTS IN COMMON FOOD PRODUCTS — SPECIFICATION

ICS 67.050

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 2006

Price Group 2

Foodgrains, Starches and Ready-to-Eat Foods Sectional Committee, FAD 16

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Foodgrains, Starches and Ready-to-Eat Foods Sectional Committee had been approved by the Food and Agriculture Division Council.

Food is an essential and basic requirement for nourishing and sustenance of human life. Preparation of food products from the raw agriculture produce to their final stage of consumption is a big business worldover. Food is adulterated by unscrupulous persons from time immemorial and is continued even today for certain commercial benefits. With the development of food science and technology, the techniques of adulteration have also changed and contamination is often observed due to unhygienic practices, chemicalization of technology, etc. Food adulteration may lead to innumerable health hazards. Food adulteration is thus a punishable offence under the provisions of the *Prevention of Food Adulteration Act*, 1954 and the *Rules* made thereunder.

Consumer awareness regarding the quality of food and alertness in detection of common type of food adulteration can help in arresting this menace and provide a healthy and wholesome food to the consumers. Therefore, simple methods to detect adulteration/contamination of various foods at the consumer organization level will be useful to the consumers to select a right type of food or to avoid foods of doubtful quality. Keeping this in view a standard IS 15642 : 2006 'Quick methods for detection of adulterants/contaminants in common food products' has been formulated. This standard includes methods involving visual examination, physical methods and methods involving the use of certain chemicals and reagents.

The test methods contained in IS 15642 are very simple and quick, thereby making them useful for school children, social workers, etc, for detecting food adulteration and contamination. Based on these methods, certain quick test kits can also be developed which may be used by schools for imparting basic education in detecting adulteration/contamination or by women organizations or voluntary consumer organization for detecting adulteration in foods. These kits may be developed to carry out either physical tests or chemical tests or both. The kits may also be developed for specific group of products like milk and milk products, edible oil, food grains, spices, etc. However, these quick methods are only indicative of possible adulteration/contamination in food items, and need to be confirmed by other detailed methods.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PORTABLE KIT FOR QUICK DETECTION OF ADULTERANTS/CONTAMINANTS IN COMMON FOOD PRODUCTS — SPECIFICATION

1 SCOPE

This standard prescribes the apparatus and reagents which may be conveniently kept in a portable kit for quick detection of adulterants/contaminants in common food products.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
253 : 1985	Specification for edible common salt (*third revision*)
264 : 2005	Nitric acid (*third revision*)
265 : 1993	Hydrochloric acid (*fourth revision*)
266 : 1993	Sulphuric acid (*third revision*)
323 : 1959	Specification for rectified spirit (*revised*)
711 : 1970	Ferric chloride, technical (*first revision*)
1070 : 1992	Reagent grade water (*third revision*)
2214 : 1977	Specification for silver nitrate, pure and analytical reagent (*first revision*)
3470 : 2002	Hexane, food grade — Specification (*first revision*)
5296 : 1995	Chloroform, pure and technical — Specification (*second revision*)
6605 : 1972	Specification for potassium chromate
7163 : 1989	Potassium iodide, pure and analytical reagent (*first revision*)
10744 : 1983	Specification for resorcinol
15642 (Parts 1 and 2) : 2006	Quick methods for detection of adulterants/contaminants in common food products

3 TESTS

The kit shall have facilities for carrying out either the physical tests for detection of adulterants/contaminants in common food products as per IS 15642 (Part 1) or chemical tests for detection of adulterants/contaminants in common food products as per IS 15642 (Part 2) or both. Smaller test kits for specific group of products like milk and milk products, edible oils, food grains, spices, etc, may also be developed.

4 APPARATUS

Depending upon whether the kit is for physical tests or chemical tests or both or for special group of products, apparatus from the following shall be provided suitable to perform the desired tests as per IS 15642 (Parts 1 and 2).

Sl No.	*Apparatus*	*Number/ Quantity*
(1)	(2)	(3)
i)	Cotton — absorbent	1 × 100 g roll
ii)	Dropper	1
iii)	Filter paper sheets — ordinary or blotting paper	10
iv)	Forceps	1
v)	Glass beakers:	
	1) 100 ml, and	4
	2) 250 ml capacity	2
vi)	Glass rods — about 10 cm size	4
vii)	Litmus paper — Red	1 booklet
viii)	Magnet — a powerful magnet	1
ix)	Magnifying glass — with a handle of about 7.5 cm length and having magnification of 10 ×	1
x)	Matchstick	1 box
xi)	Lactometer with lactometer jar	1 set
xii)	Pipettes graduated — 1 ml and 5 ml capacity	1 each
xiii)	Spirit lamp	1
xiv)	Tea spoons	2
xv)	Test tubes — 150 × 18 mm	6

5 REAGENTS

5.1 The required reagents from the following list depending upon the tests to be performed shall be kept in the kit in the screw capped narrow mouthed bottles which may be made of glass or polyethylene or polypropylene. The quantity of each reagent in the bottle shall be 20-30 ml:

1) *Acetonitrile reagent* — prepared by mixing acetonitrile and water in 7:3 ratio;
2) *Alcoholic potash* — prepared by dissolving 8.6 g of potassium hydroxide in 100 ml ethyl alcohol;
3) *Ammonium molybdate solution* — prepared by dissolving 1 g ammonium molybdate in 100 ml concentrated sulphuric acid;
4) *Antimony trichloride* — prepared by dissolving 40 g of antimony trichloride in 100 ml of chloroform;
5) Chloroform (*see* IS 5296);
6) Common salt (*see* IS 253);
7) Concentrated hydrochloric acid (*see* IS 265);
8) Concentrated nitric acid (*see* IS 264);
9) *Dilute hydrochloric acid* — 1:1 (prepared by mixing concentrated hydrochloric acid and water in 1:1 ratio);
10) *Ferric chloride* — prepared by dissolving 6 g ferric chloride in 100 ml of water (*see* IS 711);
11) Hexane (*see* IS 3470);
12) *Iodine solution* — prepared by dissolving 12.7 g of iodine and 24 g of potassium iodide in 1 litre water;
13) p-*dimethyl amino benzaldehyde reagent* — prepared by dissolving 1.6 g of *p*-dimethyl amino benzaldehyde in 100 ml ethyl alcohol containing 10 percent hydrochloric acid;
14) Petroleum ether (60-80°C);
15) *Potassium chromate solution* — prepared by dissolving 5 g of potassium chromate in 100 ml water (*see* IS 6605);
16) *Potassium iodide* — prepared by dissolving 10 g of potassium iodide in 100 ml water (*see* IS 7163);
17) *Rectified spirit* — 95 percent ethyl alcohol (*see* IS 323);
18) *Resorcinol solution* — about 2 percent (*see* IS 10744);
19) *Rosalic acid* — prepared by dissolving 1 g rosalic acid in 100 ml of ethyl alcohol;
20) *Silver nitrate solution* — 0.1 N (*see* IS 2214);
21) *Starch solution* — freshly prepared by dissolving 1 g starch in 100 ml water and boiling it;
22) *Sulphuric acid* — 10 percent (*see* IS 266), and;
23) *Sugar crystals* — about 25 g.

5.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the result of analysis.

6 FABRICATION

6.1 Material

The kit shall be made of suitable light weight material such as well-seasoned hard wood and shall be internally lined with a chemical resistant material.

6.2 Construction

The kit shall have suitable partitions, depending upon the apparatus and the number of bottles to be kept inside, so as to ensure minimum disturbances to the apparatus and reagents during movements. The neck and bottom of the regent bottles shall be placed in a tight fitting thermocol cover. One such cover shall be placed on top of the bottles having tight fitted sockets covering the neck of all bottles and the other placed below the bottles having socket in which bottom of the bottles will fit in tightly. *See* Fig. 1 for a recommendatory graphic representation of the kit showing the arrangement of bottles.

6.3 Joints

The kit shall be suitably reinforced at joints to withstand rough handling in transit and field condition.

6.4 Strapping Facilities

The kit may have strong straps for tying.

7 REQUIREMENTS

7.1 The kit shall contain all the apparatus and reagents required for carrying out the tests as declared by the manufacture (*see* **8.2**).

7.2 There shall be no damage to the kit box and bottles shall not break or leak when the kit box is dropped from a height of about 1 m.

7.3 The kit shall be able to withstand a temperature exposure of 50 ± 2°C when placed in an incubator maintained at that temperature for 30 min. When examined after this period, there shall not be any deformation of the box, the lining material and the bottles. There shall also not be any loss of reagents during this period.

8 LABELLING/MARKING

8.1 The kit shall be marked legibly and indelibly with the manufacturer's name and address.

8.2 The kit shall also be clearly marked with the tests which can be performed using the kit.

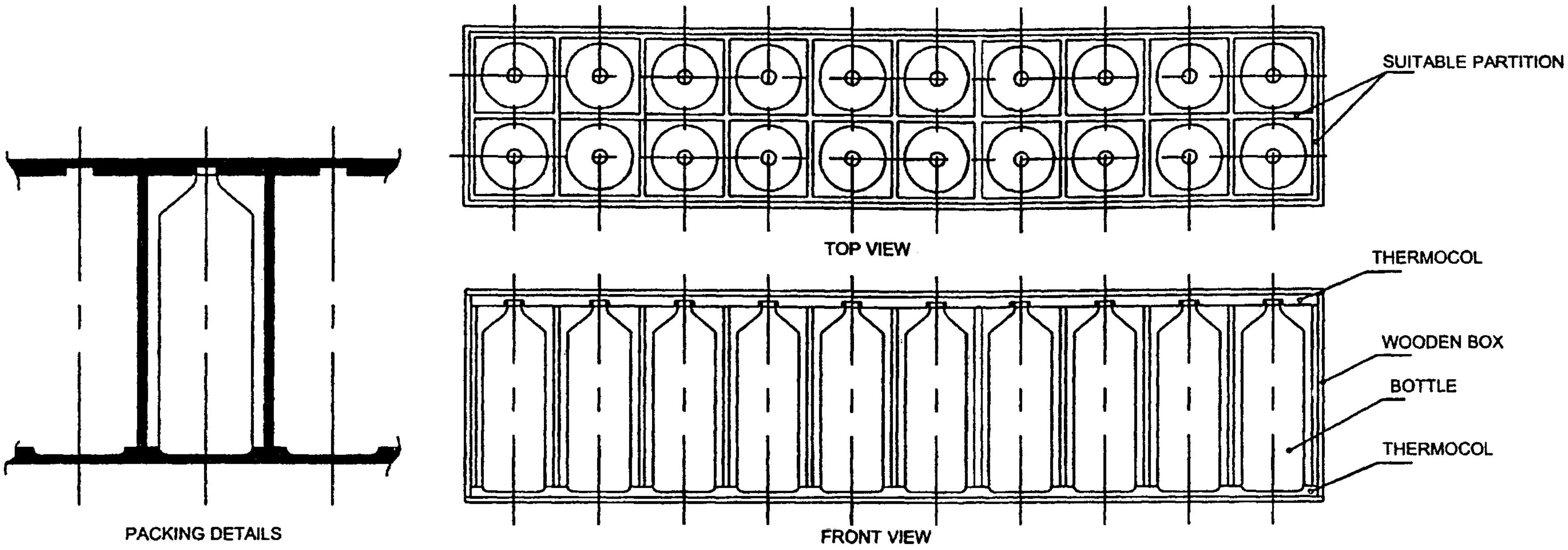

FIG. 1 BOX CONTAINING TWENTY BOTTLES OF REAGENTS

8.3 A list of the apparatus and reagents along with their quantity shall also be kept inside the kit.

8.4 A statement that the tests shall be carried out in accordance with the methods prescribed in IS 15642 shall be made either on the label of the kit or in the literature placed inside the kit.

8.5 A catalogue describing the handling of the kit and safety precautions to be followed while handling the kit shall be placed in every kit.

9 BIS CERTIFICATION MARKING

The product may also be marked with the Standard Mark.

9.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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